

Claims

1. A method of scrubbing a halogen-containing gas stream, comprising contacting the gas stream with water at a temperature of at least 30 °C.
- 5 2. A method according to claim 1, in which the gas stream is contacted with water at a temperature of at least 35 °C.
3. A method according to claim 1, in which the water is in the liquid phase.
4. A method according to claim 1, in which the gas stream  
10 is contacted with water vapour.
5. A method according to any one of the preceding claims, in which the gas stream is contacted with water at a temperature of from 35 °C to 80 °C.
6. A method according to any one of the preceding claims,  
15 in which, following said contact with water at a temperature of at least 30 °C, the gas stream is subjected to at least one further treatment step.
7. A method according to claim 6, in which said at least one further treatment step comprises contacting the gas  
20 stream with water at a temperature of less than 30 °C.
8. A method according to claim 6, in which said at least one further treatment step comprises diluting the gas stream with a diluent gas.
9. A method according to claim 6, in which the at least  
25 one further treatment step comprises a step in which the gas stream is contacted with water at a temperature of less than 30 °C and, thereafter, a step in which the gas stream is diluted with a diluent gas.
10. A method according to claim 8 or claim 9 in which the  
30 gas stream is contacted with the diluent gas in a cyclone device.

11. A method of scrubbing a halogen-containing gas stream, comprising contacting the gas stream with water, subsequently treating the gas stream in a cyclone device in which it is diluted with a diluent gas stream and  
5 withdrawing separately from the cyclone device solid particulate material and a treated gas stream.

12. A method according to claim 11, in which the temperature of the water is maintained at less than 30°C.

13. A method according to anyone of claims 8 to 13, in  
10 which the diluent gas is air.

14. A method according to any one of the preceding claims, in which the halogen-containing gas stream is an exhaust gas from semiconductor manufacture.

15. A method according to any one of the preceding claims, in which in the or each water-contacting step the gas  
15 stream is arranged to be in generally counterflow relationship with the water.

16. A method according to claim 16, in which in the or each water-contacting step the gas stream is caused to flow  
20 in a generally upward direction and the water is caused to flow in a generally downward direction.

17. A method according to any one of the preceding claims, in which the halogen-containing gas stream is a fluorine-containing gas stream.

25 18. An apparatus for scrubbing a halogen from a gas stream, comprising a hot wash scrubbing chamber in which the gas stream can be contacted with a hot wash flow of water, a water supply device for supplying to said hot wash scrubbing chamber water at a temperature of at least 30°C,  
30 a source of a halogen-containing gas for supplying to said hot wash scrubbing chamber a gas stream containing the

halogen, and an outlet from said hot wash chamber for treated gas.

19. An apparatus according to claim 18, further comprising a cold wash scrubbing chamber downstream of said hot wash scrubbing chamber, a cold water supply device for supplying to said cold wash scrubbing chamber water at a temperature of less than 30°C, a communication pathway for transport of the treated gas from the outlet of the hot wash chamber into the cold wash chamber, and an outlet for treated gas from said cold wash chamber.

20. An apparatus according to claim 19 or claim 20, further comprising a gas dilution unit in which the treated gas can be diluted with a diluent gas.

21. An apparatus according to any one of claims 18 to 20, in which the source is a source of fluorine-containing gas.